CLAIM LISTING:

1. (Currently Amended) An open loop method of reducing predictable systematic errors in grating writing in an optical waveguide, the method comprising the steps of:

a) numerically designing a theoretical test grating structure for desired spectral characteristics,

b) writing a complete test grating structure experimentally in a first portion of a first waveguide and according to the theoretical test grating structure design using a grating writing arrangement,

c) measuring the actual spectral characteristics of the complete test grating structure after it has been written,

d) reconstructing an actual design of the complete test grating structure from the actual spectral characteristics, and subsequently

e) writing a complete compensated grating structure using said same grating writing arrangement in a different portion of the first waveguide or a different waveguide using a compensated design based on a pre-comparison of the initial numerical design with the actual design of the complete test grating.

2. (Previously Presented) A method as claimed in claim 1, wherein the step of reconstructing the actual design comprises solving an inverse scattering problem based on the measured actual spectral characteristics.

3. (Previously Presented) A method as claimed in claim 2, wherein the solving of the inverse scattering problem comprises utilising a layer-peeling algorithm.

4. (Previously Presented) A method as claimed in claim 1, wherein the compensated grating structure is based on a different theoretical grating structure than the theoretical test grating structure.

5. (Previously Presented) A method as claimed in claim 1, wherein the comparison of the actual with the initial numerical design comprises subtracting deviations of the actual from the numerical design from the numerical design to form the compensated design.

6. (Previously Presented) A method as claimed in claim 5, wherein the deviations are filtered from high frequency components.

7. (Previously Presented) A method as claimed in claim 1, wherein the comparison of the actual with the initial numerical design comprises multiplying the theoretical test grating function with a ratio of the theoretical test grating function and the actual test grating function.

8. (Previously Presented) A method as claimed in claim 1, wherein the step of measuring the actual spectral characteristics comprises measuring the actual spectral characteristics of the complete test grating from both ends thereof.

9. (Previously Presented) A method as claimed in claim 8, wherein the step of reconstructing the actual design comprises utilising different weighting factors for the different end reconstructions of the complete test grating to form the reconstructed actual design.

10. (Currently Amended) A method as claimed in claim 8, wherein the step of reconstructing the actual design comprises utilizing substantially a half-sum of different end reconstructions of the complete test grating.

11. (Previously Presented) A method as claimed in claim 1, wherein steps c) to e) are repeated, wherein the compensated design structure takes on the role of the complete test grating structure.

12. (Previously Presented) A method as claimed in claim 11, wherein the steps c) to e) are repeated until a desired accuracy is achieved or no further improvement in the accuracy is found.

13. (Previously Presented) A method as claimed in claim 1, wherein the steps of writing the complete test grating and the compensated grating comprise utilising an interferometer for inducing refractive index changes in the waveguide to form the test and the compensated grating structures.

14. (Previously Presented) A method as claimed in claim 1, wherein the waveguide is in the form of an optical fibre or a planar waveguide.

15. (Currently Amended) An open loop method of writing a grating structure in a portion of a first optical waveguide utilising a grating writing arrangement, wherein predictable systematic errors in grating writing are reduced, the method comprising the step of utilising compensation information gained from conducting the steps of :

a) numerically designing a theoretical grating test structure for desired spectral characteristics,

b) writing a complete test grating structure experimentally using said same grating writing arrangement and according to the theoretical test grating structure design in a different portion of the first waveguide or a different waveguide,

c) measuring the actual spectral characteristics of the complete test grating structure after it has been written and,

d) reconstructing an actual design of the complete test grating structure from the actual spectral characteristics.

16. (Previously Presented) A method as claimed in claim 15, wherein the compensation information is provided in the form of stored compensation data previously obtained for a particular grating writing arrangement.

17. (Currently Amended) An open loop arrangement for grating writing in an optical waveguide, the arrangement comprising a processing means arranged, in use, to control the writing of a grating structure based on a theoretical grating design and compensation data obtained for the arrangement to compensate for systematic errors, wherein the compensation data is of a type obtained from conducting the steps of:

a) numerically designing a theoretical grating test structure for desired spectral characteristics,

b) writing a complete test grating structure experimentally and according to the theoretical test grating structure design,

c) measuring the actual spectral characteristics of the complete test grating structure after it has been written,

d) reconstructing an actual design of the complete test grating structure from the actual spectral characteristics, and subsequently

e) writing a complete compensated grating structure using said same grating writing arrangement in a different portion of the first waveguide or a different waveguide using a compensated design based on a pre-comparison of the initial numerical design with the actual design of the complete test grating.

18. (Cancelled)

19. (Previously Presented) A waveguide structure incorporating a grating written utilising a method as claimed in claim 1.

20. (Previously Presented) A waveguide structure incorporating a grating written utilising an arrangement as claimed in claim 17.

21. (Previously Presented) A waveguide structure incorporating a grating written utilising a method as claimed in claim 15.